

# Case study

June 2013



## Merrick & Company

### Upgrade results in \$37,000 energy rebate, helps meet LEED criteria Greenwood Village, Colorado

*Merrick & Company is an employee-owned \$111 million engineering, architecture, design-build, surveying, planning, and geospatial solutions firm, serving a variety of market sectors including energy, national security, nuclear, life sciences and sustainable infrastructure. The company has nearly 500 employees with locations in the United States, Canada, Mexico and Europe.*

#### Challenge

With the end of its lease approaching, Merrick & Company began making plans to redesign its new headquarters location, assembling its team with architect, RNL Design, general contractor, Hyder Construction, mechanical contractor, MountainAire Mechanical Heating & Cooling, LLC and mechanical design engineer, MKK Consulting Engineers, Inc. Although proper planning had allotted enough time for the renovations, employee-owners were anxious to move out of their existing facility and into their new one. In alignment with company goals, Merrick's criteria for the new building stressed energy efficiency in order to achieve a LEED Silver certification and obtain a large rebate from Xcel Energy, demonstrating its commitment to sustainability and the comfort of its employees.

#### Solution

Merrick requested Trane be the basis of design used by MKK Consulting Engineers, Inc. Trane representatives visited the new headquarters site to see first-hand what was involved in the project and submitted a proposal. Trane's proposal included energy conservation measures to be implemented in order to obtain the energy company rebate, as well as suggestions for achieving LEED Commercial Interiors (CI) Silver certification. After reviewing the proposals and evaluating the options based on cost vs return, they selected Trane to partner with them on the upgrades.



*Merrick & Company renovated a three-story, 105,000 sq ft building for its new headquarters location.*

#### System custom designed to meet comfort needs

To maintain desired temperatures and regulate air flow throughout the building, two built up penthouse variable air volume (VAV) systems were retrofitted. The systems consist of 50 HP supply fan retrofit motors, new outdoor air and return air economizer dampers, relief fan motors and interface with two fifty-ton direct expansion (DX) condensing units. Existing duct work was torn out and replaced to accommodate the new system. Thirty-seven Trane electric re-heat VAV boxes with Tracer™ UC400 programmable terminal unit controllers and sixty Trane electronically commutated motor (ECM), fan-powered VAV boxes with Tracer UC400 controls were installed. Unlike single-speed technologies, the ECMs adjust to changes in static to maintain output and reduce fan wattages for energy savings.

### Variable frequency drives improve energy efficiency

Trane TR200 variable frequency drives (VFDs) were included on the new fan motors installed, and existing constant volume fans were also replaced with the more energy efficient VFD fan motors. Besides saving energy the TR200 VFDs help to extend motor life, optimize AC motor speed control, maximize occupant comfort and reduce costs.

The condensing units are interfaced with evaporative pre-coolers, which dramatically reduce the entering condenser air temperature, cutting electrical consumption by 15 percent to 20 percent, without negatively affecting room temperature. Lower condensing temperatures help to extend equipment life and reduce service costs.

### Sensors and BAS provide convenient climate control

Trane digital sensors accurately measure air temperature, allowing the proper ratio of outdoor and indoor air for building comfort levels, and provide effective control of CO<sub>2</sub> for optimized efficiency, reduced energy costs and improved air quality. For effective operation, sensors also monitor building static, differential water and duct static pressures.

A Tracer Summit building automation system (BAS) and two Tracer™ SC System Controllers are used to manage facility climate. A Tracer™ UC600 programmable BACnet unit controller works with a Tracer™ SC System Controller to perform fan pressure optimization, demand control ventilation, sub-metering of HVAC primary loads, and trend reporting required for LEED CI certification. Accessible from any PC, tablet or connected device, Tracer SC eliminates the need for a dedicated PC, allowing convenient management of system performance.



*The new VAV system at Merrick & Company helps maintain desired office temperatures, while saving energy.*

## Results

Trane delivered equipment and controls to enable Merrick & Company a timely relocation of its headquarters facility. The comfortable, high efficiency building demonstrates the company's commitment to its employees and sustainability. Trane high efficiency ECMs, variable frequency drive technology, direct digital controls and BAS enabled Merrick & Company to obtain \$37,000 in rebates from Xcel Energy.

"We believe in practicing what we preach regarding sustainability," said Danielle Swarts, mechanical design engineer, Merrick & Company. "If we could achieve LEED Silver, then we definitely wanted to do that." Merrick and Trane developed a building flush controls program and schedule, with pre-functional and functional testing, and a trending log that recorded the amount of outdoor air provided to the building. The minimum outside air rate delivered exceeded the 0.33 CFM per square foot threshold level required by LEED. The Merrick building was designed to achieve a LEED CI Silver rating and is under review by the Green Building Certification Institute (GBCI). Merrick is also pursuing a Green Globes rating for the building.



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